

Emergence of shore fish traps ‘pattivalai’ - their design and economics of operation along Mandapam coast

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Shore fish traps, locally known as “pattivalai” are being operated along the Palk Bay and the Gulf of Mannar coast from Thangachimadam to Pudumadam for a stretch of 35 km. In 1990, there were only a few numbers, which has since increased to more than 30 at present (Fig. 1). This new fishing operation was introduced by Srilankan refugees staying in Mandapam camp. Mostly, this permanent or semi-permanent structure is placed in the near shore waters depending on the weather conditions and in some areas during a particular season. During rough weather condition (April - September) in Gulf of Mannar, this structure



Fig. 1. Pattivalai distributed along Mandapam coast

is fixed in the Palk Bay and *vice versa* in the Gulf of Mannar during October to March when the Palk Bay is rough.

Fishermen, mostly Sri Lankan refugees themselves build fish traps which may yield on an average 100 to 300 rupees per day per trap. This depends on the location and periodicity of use. A fisherman has to invest around Rs 28,245 - 30,500/- initially and spent about Rs. 500/- as maintenance cost per month in order to operate a single pattivalai successfully.

The shore fish trap is comprised of mainly four parts: heart-I or 'patti' with a single or double entrance, heart-II or 'pudukuda' with a single or double entrance, two entrance funnels or 'highesh' and long tail or 'vaal' running perpendicular to shoreline (Fig. 2a, b).



Fig. 2a. Shore fish trap or pattivalai fixed along Mandapam coast

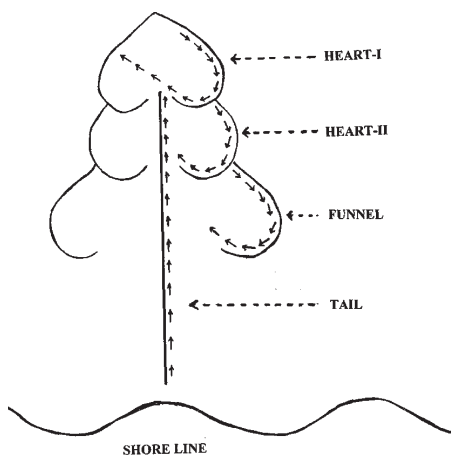


Fig. 2b. Different parts of shore trap. Arrow indicates movement of fish into the trap

Pattivalai design and construction

At first, fishermen get ready all their required materials for the erection of pattivalai as given in Table 1. They select suitable locations for their trap based on tidal amplitude, wind direction, bottom substratum, depth (3-6 cm) *etc.* Then they mark the area where the trap is to be erected. Damaged or discarded net (mesh size: 3 cm) available in local shops are purchased for making the mesh wall of pattivalai whose width/height will vary according to the depth. The height of mesh wall and pole should be from bottom to 50-100 cm above the maximum sea level. The damaged portions of waste net are mended by synthetic twine. The upper edge of the wall with head rope is stitched by hand. Similarly the bottom end of the wall with the foot rope having loops of equal intervals (100-200 cm between two loops) is stitched. The diameter of loop is generally little smaller than the pole (dia: 6 cm) for fixing the pointed pole with loop / foot rope of mesh wall under the soil. Poles are stuck into the ground along with loops in the marked area and then the mesh wall is rolled out against the poles. Another set of poles are stuck alongside the inner poles and the head rope is fastened with pole. The entire structure is erected as shown in Fig. 2a and b.

Pattivalai operation

Shoals of finfish/cephalopods/crustaceans moving along the coastal waters will meet with the tail of the trap. They swim along the tail and enter the heart-shaped part or body of the trap. The heart shape is very important according to the fishermen. Fish will swim along the mesh wall and pass through the mouth or entrance and get trapped. Harvesting is carried out by fishermen or divers working from a catamaran (2 persons/raft) or tyre-tube having bag like structure at centre (Fig. 3) with face mask, flippers and specially designed dragnet. Each fisherman checks his trap everyday at 0500 hrs. A specially designed dragnet with small sized mesh (1.5 cm) having height equal to the mesh wall of heart with floats at the head rope and sinkers at the foot rope is used (Fig. 4). Indigenously designed flippers are made of round aluminium plate (dia: 27 cm and 2 mm thickness) and broad strip of tube (2 mm) (Fig. 3). Messenger rope is fitted at bottom of the dragnet through which bottom portion is closed. When they (usually: 2 persons/raft/trap)

Table 1. Details of cost involved in fabrication and operation of pattivalai along the Mandapam coast

Components/portions of shore trap and labour charge	Building materials and others	Cost (Rs.)/kg/pole/float//piece	Total materials required for trap (cm / no. / kg)	Total cost (Rs.)
Heart-I, Heart-II and two entrance funnel	Waste netting	285	14 kg	3990
	Nylon rope (3 mm)	240	3.5 kg	840
	Poles (180-450 cm)	60 - 90 (75)	35 nos.	2625
Tail	Waste netting	285	15 kg	4275
	Nylon rope (3 mm)	240	6.5	1560
	Poles	60 - 90 (75)	65 nos.	4875
Catamaran/Lorry tyre tube	Catamaram (2x1 m)	2000 - 3000 (2500)	1 no.	2500
	Tyre tube	250	1 no.	250*
Flippers	Round aluminium plate (dia: 27 cm)	75	1 pair	150
Face mask	—	75	1 no.	75
Plastic can (50 l)				70
Labour charges				2000
Drag net	Floats	2.0	10	20
	Sinker	90	1.5 kg	135
	Knitting (Mesh :1.5 mm)	300	22 kg	6600
	Pole	75	2 nos.	150
	Labour charge			700
				30,565
Total cost				

Note: * = the cost of tyre tube is not included in the total



Fig. 3. Lorry tyre tube with flippers used by pattivalai fishermen

reach heart-II portion of trap, the catamaran is moored. Two divers get down with face mask and flippers and then lower the drag net. Each diver swims and carries each pole of dragnet and drags it along the periphery of heart-II in such a way that fish will not escape through the entrance. Fishes are thus forced to move into the heart-I portion of trap. Once again the drag net is dragged along the



Fig. 4. Drag net designed for harvest of fish from pattivalai

periphery and two opposite side pole is brought together slowly. The messenger rope is pulled so that the bottom end can be closed. Entire drag net with trapped fishes is rolled like a mat. Entire rolled structure of net is brought to shore for collecting trapped fishes. The fishes are collected into plastic can. Unwanted fishes are released back into the sea.

Economics of operation

Fishermen have to spend Rs. 2000/- for preparation and erection of mesh wall of trap and Rs 7600/- for drag net. Cleaning of mesh wall of trap against the fouling organisms is done once in a month by washing the net with bleaching powder at shore. Re-erection of entire structure is being carried out for Rs. 500/-. Sometimes incidental expenses may

occur due to the damage caused by trawler movement in the region.

This method of fishing results in fish staying alive until the time they are brought to local market. Traps have historically proven to be effective but are non-selective *i.e.*, traps capture a high percentage of non-target species. In fact, fish trapping has already been banned in several areas of the world because of its detrimental effect on coral reef communities.